

Work Order ID 58499

May 7, 2010 2:25:01 PM



Page 1

Item ID: D205-634-041

Accept



Setup Start



Revision ID:

Item Name: Replacement Skidtube

Stop



Start Date: 07/05/2010 Start Qty: 1.00



Cust Item ID:

Required Date: 24/05/2010 Req'd Qty: 1.00



Customer:

Reference:

Approvals:

Process Plan:

[Signature]

Date: 10-5-09

Tooling:

Date:

Run Start



QC:

Date:

SPC (Y/N):

Date:

Stop



Sequence ID/
Work Center ID

Operation
Description

Set Up/
Run Hours

Draw
Number

Draw
Rev.

Plan
Code

Accept
Qty

Reject
Qty

Reject
Number

Insp.
Stamp

Draw Nbr

Revision Nbr

D2580

Rev D

100

0.00



DOCUMENT CONTROL

DC

Memo

0.00

Document Control

Photocopy D205-634 bluefile & type labels per PPP D205-634-041 CHG002

N/A

110

0.00



BENDING MACHINE - SKIDTUBES

CNC Bend I

Memo

0.00

CNC Delta 100 Bender

1-Bend as per program D2580.C on CNC Bender and Folio FT009

2-Cut tubes as per Dwg. D2580

10/5/13

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
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Stop



Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Draw Number	Draw Rev.	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
120		0.00							
						1	-	-	AWM 10-3-13
Skidtubes	Memo	0.00							
Skidtubes	1- Deburr ends								
	2- C'sink holes as per dwg without cutting fluid								
	3- Prepare tube for welding, remove alodine as required.								
	4- Scribe batch number insied aft end of tube.								
130	QC5- Inspect part completeness to step on W/O	0.00							
QC	Memo	0.00							
Quality Control									

①

JE 10/05/14

W/O:		WORK ORDER CHANGES					
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Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

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Run Start



Stop



Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Draw Number	Draw Rev.	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
--------------------------------	--------------------------	----------------------	----------------	--------------	--------------	---------------	---------------	------------------	----------------

140

0.00



Skidtubes

Memo

0.00

Skidtubes

1-Weld step D2576 as per Dwg. D2580 and QSI 004.

A/R□□□ Aluminum Rod

m12860

BE 10/05/14

2-Prep per QSI 005 and weld crossbolt spacers D2579 as per Dwg. D2580, QSI 004.

For D2579 spacers, weld one side, pass 3/8" drill, weld other side, pass 3/8" drill

A/R□□□ Aluminum Rod

m12860

BE 10/05/14

3-Grind welds as per Dwg D2580 Grind flush ridge made from bending

4-Drill holes for wearplates using DT 8217 & DT8937 Open holes to 19/64", adjust stopper not to hit web. Deburr

m 10/5/17

5-Counterbore crossbolt spacers to 7/16" ID x 1.0" deep as per Dwg D2580. Deburr holes

m 10/5/18

6-Drill pilot holes for aft cap using DT 8215 Open holes to 0.208". Deburr

m 10/5/17

7-Drill pilot holes for Tow ring using DT8091, open to .640" and Deburr

m 10/5/18

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May 7, 2010 2:25:01 PM



Page 4

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Run Start



QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop

Sequence ID/
Work Center IDOperation
DescriptionSet Up/
Run HoursDraw
NumberDraw
Rev.Plan
CodeAccept
QtyReject
QtyReject
NumberInsp.
Stamp

150

QC10- Inspect visual per QSI004- ground welds

0.00

S 6/05/10



QC

Memo

0.00

Quality Control

160

QC5- Inspect part completeness to step on W/O

0.00

S 6/05/10



QC

Memo

0.00

Quality Control

170

Pressure Wash per QSI005 4.3

0.00



HandFinish

Memo

0.00

Hand Finishing

Re-alodine tube as per QSI 005 section 4.1.2.1 do not acid etch and leave fwd cap out of solution.

D BR 10-5-19.

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Page 5

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QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Run Start



Stop



Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Draw Number	Draw Rev.	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
180 	White Gloss(Ref:4.3.5.1) per QSI005 4.3-Alum Memo START TIME: 11:00AM OVEN TEMPERATURE: 370°F FINISH TIME: 11:30AM	0.00 0.00	⇒ 10/05/19			1	Ø		
Powdercoat Powder Coating									
190 	QC3- Inspect Part Finish Memo	0.00 0.00							
QC Quality Control									

1 BR 10-5-20

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May 7, 2010 2:25:01 PM



Page 6

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Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start



QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop

Sequence ID/
Work Center IDOperation
DescriptionSet Up/
Run HoursDraw
NumberDraw
Rev.Plan
CodeAccept
QtyReject
QtyReject
NumberInsp.
Stamp

200

0.00



HandFinish

Memo

0.00

Hand Finishing

1-Install inserts & wearplates & Gaskets as per Dwg. D2580. Use a drop of Sikaflex on insert holes before installing wearplates
A/R ☐ ☐ ☐ Sikaflex-291 ☐ 112429
Sikaflex expire date: 10/08

2-Coat D2594-3 O' rings with Petroleum Jelly and install on D2594-1 plugs as per Dwg D2580

3-Inspect for foreign object per QSI 024

4-Install 2855 Aft Cap as per Dwg D2580 and seal Fwd Step & Aft Cap with Sikaflex. Clean excess adhesive
A/R ☐ ☐ ☐ Sikaflex-291 ☐ 112429
Sikaflex expire date: 10/08

5-Wing Walk as per Dwg D2580 and QSI 005 4.4
Batch: 114432

① BF 10-5-20.

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May 7, 2010 2:25:01 PM



Page 7

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Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____
QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Run Start



Stop



Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Draw Number	Draw Rev.	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
210	QC5- Inspect part completeness to step on W/O	0.00							
QC	Memo	0.00							
Quality Control	Inspect Aft Cap, Fwd Step and Wing Walk of work to Current Step Inspect for Foreign objects per QSI 024								
220	Packaging	0.00							
Packaging	Memo	0.00							
Packaging	Identify and pack for shipping as per PPPD205-634-041								
	Location: _____								
	PPP Rev: <u>PPA 58-219</u>								
230	QC21- Final Inspection - Work Order Release	0.00							
QC	Memo	0.00							
Quality Control									

S 10/05/25



P4/03(7)

10/06/01

ME
10-5-31

W/O:		WORK ORDER CHANGES					
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Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

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May 7, 2010 2:25:05 PM

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Comments: IPP Rev:N 02.08.28 FP was QC5 in Step 27; Added QC5 to Step 30 KJ
 IPP Rev P 10.02.19 per PAR09-043 EC verified by:DD
 IPP Rev. O 06.02.28 Added paperwork EC
 IPP Rev:P 07-07-09 SS Wearplates & Gaskets JLM

Start Qty: 1.00

Required Qty: 1.00

D2580-1 Manufactured No 110 Each 9.0000 1



205 Skidtube bent detail

Location	Loc Qty	Loc Code
LG	9	
57028	1	
57347	1	
57902	1	
57938	2	
58090	2	
58112	2	

1358385 D 11/2/5/13

D2576-3 Manufactured No 140 Each 110.0000 1



Step (maching detail)

Location	Loc Qty	Loc Code
LG	110	
46661	62	
52215	48	

BE 10/05/14

D2579 Manufactured No 140 Each 193.0000 20



Crossbolt Spacer

Location	Loc Qty	Loc Code
LG	193	
57052	13	
57348	180	

20 BE 10/05/14

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May 7, 2010 2:25:05 PM

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 IPP Rev:P 07-07-09 SS Wearplates & Gaskets JLM

Start Qty: 1.00

Required Qty: 1.00

D2855 Manufactured No 200 Each 105.0000 1



Cap



Location	Loc Qty	Loc Code
FP6	2	
56613	2	
ST026	103	
50513	1	
50770	29	
51539	19	
53791	54	

1 BR 10-5-20

AN3-5A Purchased No 200 Each 963.0000 2



Bolt



Location	Loc Qty	Loc Code
ST350	963	
105057	963	

2 BR 10-5-20

AN960JD10L Purchased No 200 Each 4,297.000 2



Washer



Location	Loc Qty	Loc Code
ST348	4297	
110985	4297	

2 BR 10-5-20

ALS7-1032-130 Purchased No 200 Each 17.0000 50



Insert



Location	Loc Qty	Loc Code
ST282	17	
113238	17	

50 BR 10-5-20

ALS4-1032-130 (114654)
 (50)

May 7, 2010 2:25:05 PM

Shop Packet Print

Page 2

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May 7, 2010 2:25:05 PM

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 IPP Rev. O 06.02.28 Added paperwork EC
 IPP Rev:P 07-07-09 SS Wearplates & Gaskets JLM

Start Date: 07/05/2010

Required Date: 24/05/2010

Start Qty: 1.00

Required Qty: 1.00

AN3C4A Purchased No 200 Each 1,939.000 50



BOLT

Location	Loc Qty	Loc Code
ST350	1939	
114103	501	
114108	300	
114416	138	
114523	1000	

AN960C10L Purchased No 200 Each 0.0000 50



washer

D3566-13



Gasket

NAS1149C0338R 114341

Manufactured No 200 Each 33.0000 1

Location	Loc Qty	Loc Code
FP	33	
53461	33	

D3566-5 Manufactured No 200 Each 21.0000 1



Gasket

Location	Loc Qty	Loc Code
FP015	21	
57526	1	
57682	20	

May 7, 2010 2:25:05 PM

Shop Packet Print

Page 3

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 IPP Rev:P 07-07-09 SS Wearplates & Gaskets JLM

Start Date: 07/05/2010

Required Date: 24/05/2010

Start Qty: 1.00

Required Qty: 1.00

D3566-1 Manufactured No 200 Each 41.0000 2



Gasket



Location

Loc Qty

Loc Code

FP015

41

57715 ✓

20

58182

21

2 BL 10-5-20

D3564-11 Manufactured No 200 Each 9.0000 1



Wearshoe



Location

Loc Qty

Loc Code

FP019

9

57957 ✓

9

1 BL 10-5-20

D3564-13 Manufactured No 200 Each 27.0000 1



Wearshoe



Location

Loc Qty

Loc Code

FP17

27

56533

1

57684 ✓

12

57922

14

1 BL 10-5-20

W/O:		WORK ORDER CHANGES					
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 IPP Rev:P 07-07-09 SS Wearplates & Gaskets JLM

Start Date: 07/05/2010

Required Date: 24/05/2010

Start Qty: 1.00

Required Qty: 1.00

D3564-9 Manufactured No 200 Each 22.0000 1



Wearshoe

Location	Loc Qty	Loc Code
FP	1	
55334	1	
FP019	21	
57685 ✓	7	
57958 ✓	14	

1 PR 10-5-20

D3564-5 Manufactured No 200 Each 7.0000 1



Wearshoe

Location	Loc Qty	Loc Code
FG	1	
34806	1	
FP19	6	
57525 ✓	1	
57729 ✓	5	

1 PR 10-5-20

D2594-3 Manufactured No 200 Each 407.0000 16



O-Ring, 205 Skidtube

Location	Loc Qty	Loc Code
FP	407	
55546	19	
58191 ✓	388	

16 PR 10-5-20

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Page 6

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IPP Rev. O 06.02.28 Added paperwork EC
IPP Rev:P 07-07-09 SS Wearplates & Gaskets JLM

Start Qty: 1.00

Required Qty: 1.00

D2594-1 Manufactured No 200 Each 382.0000 16



Plug, 205 Skidtube

Location

Loc Qty

Loc Code

FP	382	
42807	112	
55002	128	
57826	142	

58499

16. BL 10-5-20

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NOTE: Date & initial all entries

DART

DESIGN <i>[Signature]</i>	DRAWN BY <i>[Signature]</i>	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
CHECKED <i>[Signature]</i>	APPROVED <i>[Signature]</i>	DRAWING NO. D2580	REV. D SHEET 1 OF 3
DATE 07.02.27		TITLE 205 SKIDTUBE ASSEMBLY	SCALE NTS
A	96.09.16	NEW ISSUE	
B	96.12.02	AS MANUFACTURED	
C	98.08.26	REDRAWN, INCLUDED DEO 9094/9097	
D	07.02.27	CHANGE TO SS WEARPLATES AND GASKETS, INCLUDE DEO 9124/9183	

RELEASED
07.06.28 *[Signature]*

QTY -041	QTY -045	Part Number	Description
X		D2580-041	SKIDTUBE ASSEMBLY
	X	D2580-045	SKIDTUBE ASSEMBLY
1	1	D2500-1-190	EXTRUSION
1	1	D2576-3	STEP
20	24	D2579	CROSS BOLT SPACER
16	16	D2594-1	PLUG
16	16	D2594-3	O-RING
1	1	D2596	205 WEB
1	1	D2855	AFT CAP
1	1	D3564-5	WEARSHOE
1	1	D3564-9	WEARSHOE
1	1	D3564-11	WEARSHOE
1	1	D3564-13	WEARSHOE
2	2	D3566-1	GASKET
1	1	D3566-5	GASKET
1	1	D3566-13	GASKET
50	50	ALS7-1032-130 or AKS7-1032-130 or AKS4-1032-130 or AELS-1032-130	INSERT
50	50	AN3C4A	BOLT
2	2	AN3-5A	BOLT
50	50	AN960C10L	WASHER
2	2	AN960JD10L	WASHER

SHOP COPY
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ENGINEERING
UNCONTROLLED COPY
SUBJECT TO AMENDMENT
WITHOUT NOTICE
WORK ORDER
NO. *58497*

RS10-5-07

GENERAL NOTES:

- 1) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED
- 2) ALL DIMENSIONS ARE IN INCHES
- 3) INSERT D2596 WEB TO LOCATION SHOWN OFF AFT END OF SKIDTUBE AND BOND WEB INTO OUTER TUBE WITH NON-STRUCTURAL SIKAFLEX-241 ADHESIVE PER DART QSI 015 BEFORE BENDING. ENSURE HOLES LINE-UP.
- 4) BEND AS A SMOOTH RADIUS STARTING WITH A MAXIMUM CENTERLINE RADIUS OF 60 AND ENDING WITH A MINIMUM RADIUS OF 30. A MAXIMUM REDUCTION OF 0.200 IN DIAMETER IS ALLOWABLE IN THE BENT PORTION OF THE TUBE.
- 5) USE DART DRILL TEMPLATE TD2577-205 TO LOCATE AND DRILL $\varnothing 0.297$ HOLES FOR WEARSHOE INSERTS. INSTALL ALS7-1032-130 PER SECTION D-D (50 PLACES) AFTER FINISH. INSTALL AN3C4A BOLTS AND AN960C10L WASHERS WITH SIKAFLEX-241/-291.
- 6) WELDING TO BE DONE PER DART QSI 004.
- 7) FINISH:
SEE NOTES ON
PAGE 2 FOR D2580-041 AND
PAGE 3 FOR D2580-045
- 8) INSERT D2594-1 PLUG C/W D2594-3 O-RING IN HOLES MARKED 'P' (BOTH SIDES OF TUBE) AFTER FINISH (16 PLACES).

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Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

RELEASED
07-06-28

Diagram illustrating the grinding locations on a propeller cross-section:

- GRIND FLUSH (4 PLACES)
- GRIND FLUSH
- D2576-3 STEP
- GRIND FLUSH
- LOCATION RIDGE ON UNDERSIDE OF D2576

Diagram illustrating the installation of a D2855 CAP. The diagram shows a circular cap with a central hole. The following components and dimensions are labeled:

- DRILL PRIOR TO D2855 CAP INSTALLATION (2 PLACES)
- SEAL WITH SIKAFLEX-241/-291
- AN3-5A BOLT (1)
- AN960J10L WASHER (1) (2 PLACES)
- D2855 CAP
- 0.208
- 0.40

D2579 SPACER

D2596 WEB (REF)

ALS7-1032-130 (REF)
(TYP 50 PLACES)

AFTER PERFORM

1. CHA
2. INS
3. WEL
4. C

i) FINISH: ACID ETCH, ALODINE PER DART QSI 005 4.1 PRIOR TO INSERTING D2596 WEB POWDER COAT ASSEMBLY GLOSS WHITE (REF. 4.3.5.1) PER DART QSI 005 4.3 BLACK ANTI-SKID PAINT AS INDICATED PER DART QSI 005 4.4

37.50
DISTANCE TO AFT END
OF D2596 WEB

3
7

1.750
1.750

8.750
17.375
26.000
34.188

57.313 (REF)
7 EQUAL SPACES
8.188 PITCH


38.0
91.500
190.0
(D2500-1)

REFER TO DETAIL A

REFER TO DETAIL A

Ø0.508 (TYP.)
(40 PLACES)

[illegible][illegible]

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DATE 07.02.27		TITLE 205 SKIDTUBE ASSEMBLY			SCALE 1:24

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

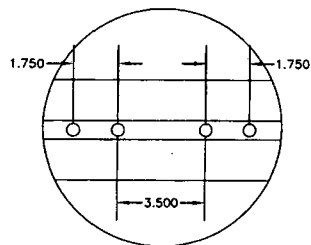
Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

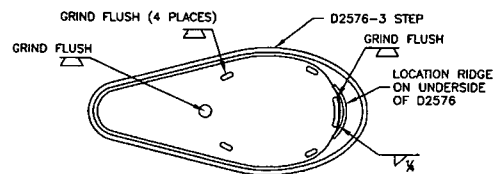
NOTE: Date & initial all entries

DETAIL E
SCALE 5:24

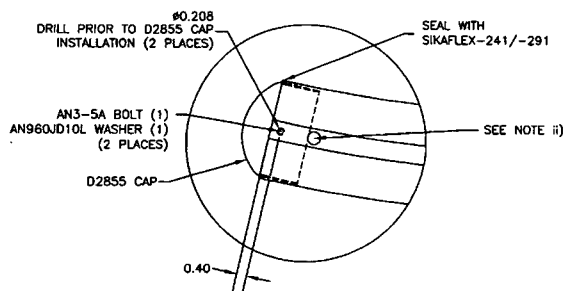


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07 Dec 88

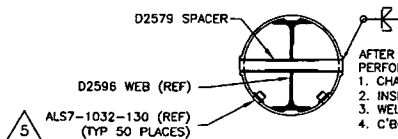
DETAIL F
SCALE 5:24



DETAIL G
SCALE 5:24

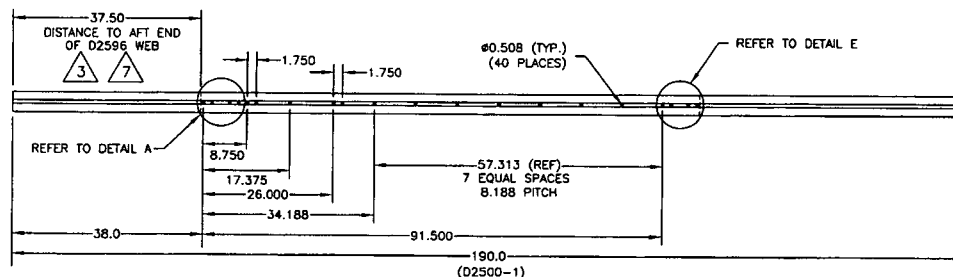


SECTION H-H
SCALE 5:24

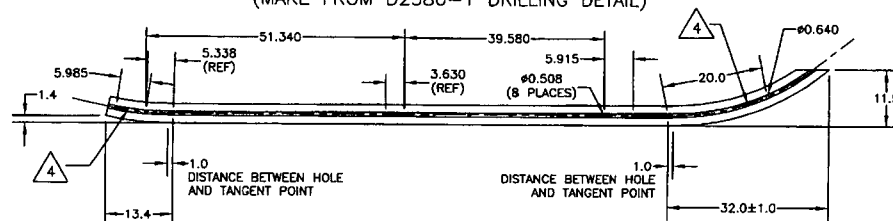


- AFTER DRILLING AND BENDING ASSEMBLY PERFORM THE FOLLOWING FOR #0.508 HOLES ONLY:
1. CHAMFER HOLE 0.050 X 45°
 2. INSERT D2579 SPACER (20 PLACES)
 3. WELD INTO PLACE AND GRIND FLUSH
 4. C'BORE D2579 SPACER TO #0.437 X 1.00 DEEP

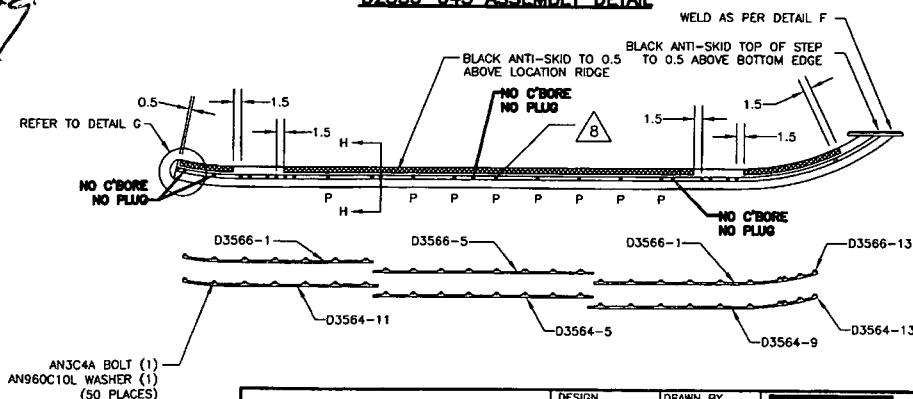
D2580-1 DRILLING DETAIL



D2580-5 BENDING AND CUTTING DETAIL
(MAKE FROM D2580-1 DRILLING DETAIL)



D2580-045 ASSEMBLY DETAIL



D2580-045 NOTES

- FINISH: ACID ETCH, ALODINE PER DART QSI 005 4.1 PRIOR TO INSERTING D2596 WEB POWDER COAT ENTIRE ASSEMBLY GREEN (REF. 4.3.5.8) PER DART QSI 005 4.3 BLACK ANTI-SKID PAINT AS INDICATED PER DART QSI 005 4.4
- IT IS ACCEPTABLE TO GRIND A RELIEF IN THE D2855 AFT CAP TO PREVENT INTERFERENCE WITH THE SPACER AT THIS LOCATION

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DESIGN	DRAWN BY	DART	DART AEROSPACE LTD.
CHECKED <i>RH</i>	APPROVED <i>RH</i>	DRAWING NO. D2580	REV. 0
DATE 07.02.27	TITLE 205 SKIDTUBE ASSEMBLY	SHEET 3 OF 3	SCALE 1:24

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

NO. 20

AWS D17.1.2001
QUALIFICATION TEST RECORD

Name: Barclay Elliott
Job number: 576830
Part number: D205-634.041
Description: 205 skid tube
Welding Process: Tig[☒] Mig[]
Base material: Aluminum
Current: AC[☒] DC[]

TEST REQUIREMENTS AND RESULTS

Visual: pass[☒] fail[]
Penetration: pass[☒] fail[]

UNACCEPTABLE

Cracks: pass[☒] fail[]
Undercut: pass[☒] fail[]
Pin holes: pass[☒] fail[]
Overlap (cold lap): pass[☒] fail[]
Porosity (surface): pass[☒] fail[]
Coloration: pass[☒] fail[]

Qualifier [Signature] Date of Test Coupon 10.04.27

Welder [Signature] Date of Test Coupon 10.04.27

The above named individual is qualified in accordance with AWS D17.1.2001 to weld